

TITLE:

CONTAINER

FIELD OF THE INVENTION

This invention relates to containers.

BACKGROUND

5       Conventional hand-held lid-and-case containers whether hinged or separable, open and close in most cases requiring both hands, and are generally inconvenient.

THE INVENTION

According to one aspect, the invention consists in a container comprising a case, a lid and a support, in which there are first means to effect a rotary connection of the  
10   case to the lid, and second and third means to effect a rotary connection of the case and lid respectively to the support, the first means being intermediate between the second and third means, at least one of the said means being adapted to effect also a shift connection.

The term "rotary" includes a hinge action provided by the bending of a connecting  
15   member, as well as the more conventional kind of pivot hinge, and other types indicated below. The term "shift connection" refers to a translation or other movement which is not simply rotation about some centre of rotation. This may be a translation, or it may be two rotations in opposite directions about respective centres of rotation, e.g. to the total effect of translation with or without a total rotation. The  
20   invention may have particular application to being such that it can be held in one hand and simultaneously opened using only that hand.

Embodiments of the invention may include any one more of the following features:

- said one means is adapted to effect a rotary and slidable connection;

- said third means comprises a said shift connection means;
- two of said first, second and third means comprise a said shift connection means;
- the case has a closed end that is rotarily connected by said second means to the support and has an open end, and the lid has an open end at which it is rotarily connected by said first means to the open end of the case and has a closed end rotarily connected by said third means to the support;
- at least one of said rotary connection means comprises a pin-and-socket rotary connection;
- at least one of said rotary connection means comprises a bending member rotary connection;
- at least one of said rotary connection means comprises an elastic rotary connection;
- at least one said shift connection means comprises a pin-and-guide connection; (this will normally be a sliding connection, but could be otherwise, e.g. a rack-and-pinion connection;)
- at least one said shift connection means comprises a double pivot connection;
- at least one said shift connection means comprises an elastic connection;
- the support has a gap through which an actuator, e.g. a finger, can open the container;
- the support has the form of a tray in which the case and lid can rest when the container is closed;
- in which the support has the form of a frame;
- the support has opposite side walls which can be gripped to grip the container;

- the opposite side walls each have an upward gap and below this a gripping region;

- latching means to hold the container closed;

- the latching means comprise lugs on either side of the container.

5 In the following, the term "base" will be used for the support since the container will normally be held with the support underneath, resting on the hand, but this is not to restrict the manner of use of the container.

Another aspect of the invention consists in a container comprising a base, a case pivoted to the base, and a lid pivoted to the case and pivotally slidably connected to  
10 the base, the container being such that it can be held in one hand and simultaneously opened using only that hand, the lid-to-case pivot being intermediate between the case-to-base pivot and the lid-to-base connection.

Embodiments of such a container may have any one or more of the following features:

15 - the case has a closed end that is pivoted to the base and has an open end, and the lid has a hinge at which it is pivoted to the open end of the case and has a closed end pivotally slidably connected to the base;

- the base is provided with slots and the lid has lugs which slide pivotally in the slots;

20 - the closed end of the case is mounted to the base by means of a pair of cylindrical pivot lugs assembled co-axially within corresponding circular holes in the base, the open end of the case has a boss parallel to the edge of the case with a concentric, cylindrical hole, the lid has a corresponding cylindrical pin assembled co-axially with the hole in the boss, thereby providing a hinge interconnecting the case

and lid and providing a second pivot point, the closed end of the lid is mounted by means of a pair of cylindrical lugs inserted into a corresponding pair of slots in the base, these lugs being free to slide within the slot length;

- the base has a cut-through through which a finger can push the case from the  
5 underside of the base to open the container;

- the base has trimming to hide mechanical features of the container;  
- the container comprises latching means to hold the container closed;  
- there are relief means to facilitate the action of the latching means;  
- the latching means comprise two protruding lugs one on each side of the case  
10 which, when the container is closed, have a latching effect to maintain the container closed;

- the latching means comprise magnetic means to have a latching effect to maintain the container closed;

An embodiment of such a container may provide for the robust storage of any  
15 product that fits within the container envelope requiring only a single handed operation to open it. A list of typical uses may be to store cigarettes, sweets, credit cards, money, mobile devices and other personal items.

An object of this embodiment is to provide a means of storing items in a robust container where potential risk of damage is minimised. And to provide the user with  
20 the possibility of a single-handed operation for opening the container, which would allow one hand to remain free for any other purpose.

Another aspect of the invention consists of a case, a lid, and a base. The closed end of the case is mounted to the base by means of a pair of cylindrical pivot lugs assembled co-axially within the corresponding circular holes in the base. The open end

of the case has a boss parallel to the edge of the case with a concentric, cylindrical hole for which the lid with a corresponding cylindrical pin would be assembled co-axially with the hole in the boss. This provides a hinge interconnecting the case and lid and providing a second pivot point. The closed end of the lid is mounted by means of a pair of cylindrical lugs inserted into a corresponding pair of slots in the base these lugs are free to slide within the slot length. There are also two protruding lugs on each side of the case which when the case is closed, has a latching effect on the assembly.

There is a cut-out through the base so in the closed state, the case may be pushed from the underside to provide the opening force.

For aesthetic purposes, the embodiment may hide the slot and hole features on the base by means of trimming pieces on the external side faces of the base which faces can be adapted to provide clip retaining means for these side pieces in any convenient manner.

Embodiments of the present invention are preferably made from a plastics material but could wholly or partly be produced from materials such as card, wood, metal, ceramic or rubber.

#### DESCRIPTION RELATING TO THE DRAWINGS

Reference will now be made by way of the example to the accompanying drawings, in which:

Figure 1 is a perspective view of a container embodying the invention in its closed state;

Figure 2 is an underneath plan view of the container of Figure 1;

Figure 3 is a side view of the container in the fully open state;

Figure 4 is a perspective view from the opposite side showing inside the case;

Figures 5, 6 and 7 are side, plan and end views respectively of an embodiment similar to that of Figures 1 to 4, as moulded of plastics material in a single piece, before being folded into the form shown in Figure 1 to 4; Figures 6 and 6a are views  
5 in the directions 6-6 and 6a-6a respectively;

Figure 7 is a plan view corresponding to Figure 6 of an embodiment similar to that of Figures 1 to 4 cut from a single piece of card, before being folded into the form shown in Figures 1 to 4;

Figures 8 to 14 are schematic diagrams corresponding to Figure 3 showing  
10 different manners of providing the rotary means; in each of these Figures the lower diagram represents the container closed and the upper diagram represents the container open; Figures 8, 10 and 13 illustrate respectively three such manners, while the others of these Figures to the right of them illustrate possible configurations of the case and lid for these manners respectively; and

15 Figures 15, 16 and 17 are partial side views corresponding to Figure 3 showing different manners of providing the shift function of the rotary means.

Referring to the drawings, Figures 1 and 2 portray the container 1 in the closed position depicting the constituent parts a case 2, a lid 3 and a base 4. In this preferred embodiment of the invention the parts may be made from plastic, and may be  
20 coloured and semi-translucent or opaque.

In the closed state, the case 2 is retained in position, symmetrically on either side of the case 2, by means of a pair of cylindrical protruding latching features 5. They possess either a spherical end face or the end face having a large radius relative to its diameter. A relatively large radius at the base of the latching features 5 would ensure

that they do not snap off. As the force of closing the case 2 is applied either to case 2 or lid 3, each latching feature 5 would slightly interfere with the inside of the base 4 until they position into their corresponding holes 6 in the base 4 which would each have a slightly larger diameter than that of the latching features 5. This would hold the container 1 closed until manually opened. Relief slots 61, Figure 4, could be present in the base 4, either side of each hole 6, to form a relief tongue area 62 to relieve the pressure on the area 62 which is stressed by latching features 5 on opening and closing, allowing a cantilevered displacement of the stressed area 62 on interference of the boss 5. Latching means 5, 6 may be replaced by latching means comprising magnetic means, e.g. a magnet 5 and magnetic material 6, to have a latching effect (positive holding when they touch) to maintain the container closed.

It can be seen in Figures 1 and 2 that there is one cylindrical pivoting and sliding lug 7 on each side of the lid 3. They are symmetrically opposite each other about the mid-plane of lid 3 widthways. In the closed state of the container 1, the lugs 7 are in the lower end of the sloping slot 8. The diameter of the lugs 7, is slightly smaller than the width of the slots 8 thus allowing ready translation and rotation of the lid 3 about the lugs 7. There is a pivot lug 9 on each side of the case 2, symmetrically opposite each other and about its mid-plane lengthways, they are slightly smaller in diameter than the corresponding holes 10 in the base 4 thus allowing a ready rotation of the case 2 about the pivot lugs 9.

Figures 3 and 4 show the container 1 in its maximum opening position. The container 1 includes a hinge feature which interconnects with the lid 3 by means of an integrated pin 11 feature on the lid 3 and a co-operating integrated receptacle boss 12 feature on the case 2. The boss 12 is a feature which protrudes lengthways along

the open edge of the case 2 and has a cylindrical hole with a length and diameter suitable for the pin 11. The pin 11 is a feature which is placed along but offset from the edge of the lid 3; the offset is enough to allow the boss 12 feature to rotate about the pin 11 feature. The pin 11 assembles co-axially within the boss 12 and is a loose fit so that the lid 3 is free to rotate with the case 2 whilst they are coupled together. In other embodiments of this invention a non-integrated hinge may be used in the place of the integrated hinged features, or the boss 12 feature may be on the lid 3 and the pin 11 feature may be on the case 2.

It can be seen in Figures 3 and 4 that the pivoting and sliding lugs 7 on each side of the lid 3 are in the other extreme of the slots 8 when container 1 is in this open position. The contents of the container 1 are fully accessible in this state where the lid 3 and case 2 interface is at approximately right angles. The opening angle is dependent on the slot 8 length, angle and form. In other embodiments of this invention, a variation in opening angle may be achieved by varying the dependent factors of the slot 8.

To open the container 1, it may be held resting on one hand, gripped on either side in the region of holes 6 (which may be called a gripping region) by the thumb and middle finger respectively, preferably with the thumb also resting on the lowest part of the upper exposed edge of one cut-out 13 of the base 4 side wall. A force may be applied to the case 2 directly or through the cut-out 14 (shown in Figure 2) in the base 4, pushing upwards perpendicular to the base 4 and in the direction to produce rotation of the case 2 in the anticlockwise direction about the pivot lug 9, all with specific reference to the view shown in Figure 3. This action simultaneously slides and rotates the lid 3 clockwise (also referring to Figure 3) throughout the travel



permitted by the slot 8 length. The cut-outs 13 may be any form suitable for the thumb or a finger to be placed on. The cut-outs 13 provide a feature that is not essential but is useful in embodiments of the invention where the base 4 is flexible, e.g. when made of card which, in the absence of cut-outs 13, might deform inwardly, sufficiently for friction to impede the upward movement of case 2. In such a case, the thumb resting on the upper range of cut-out 13 can help to press it down against the finger inserted through the cut-out 14 without requiring so much pressure between the thumb and second finger to grip base 4. Cut-out 13 is similarly useful in embodiments of the invention where the case 2 and lid 3 have widths which are greater than that of the base 4, e.g. above the height of the wall of the base 4, which they thus overhang. The cut-out 14 in the base 4 may be any size and shape with the requirement that it allows a reasonable finger-sized access to the under-face of the case 2 without significantly compromising the structure and strength of the base 4.

This force may be applied by pushing a convenient finger of the holding hand through the cut-out 14 thereby permitting the single-handed operation for opening. Alternatively the case 2 may be pulled directly upwards by a hand or fixture whilst the base 4 is held in place by a hand or a fixture, thereby applying the same direction of forces to open the container 1 as required, as described above.

To close the container 1, a force to the case 2 in the opposite direction to that as described for the opening action is required.

In the embodiment of Figures 5 to 6a, the bridge 9/10 of plastics material bends readily to provide a rotary connection between case 2 and base 4, and the bridge 11/12 bends readily to provide a rotary connection between case 2 and lid 3. To erect the container 1, lid 3 is rotated 180 degrees clockwise about bridge 11/12, and then lid

3 and case 2 together are rotated 180 degrees anticlockwise about bridge 9/10 until lugs 7 can be forced past the slightly flexible walls of support tray 4 (which walls are temporarily separated slightly for this purpose) into slots 8. The embodiment is then operable in the same manner as that of Figures 1 to 4. To facilitate the moulding, slots 8 are made open-ended. The cut-out 14 may be made very large, as shown in Figure 6, to save plastics material, almost as large as the base of support tray 4, which thus becomes no more than a support frame, rather than a panel with a cut-out 14 as illustrated in Figure 2.

In the embodiment of Figure 7, the dashed lines represent fold lines (except member 20 to be described below), and the full lines within the periphery of the cut-out web 1 represent cut lines. Hinge line 9/10 bends readily to provide a rotary connection between case 2 and base 4, and hinge line 11/12 bends readily to provide a rotary connection between case 4 and lid 3 (when these parts are erected from the web 1). Hinge line 9/10 and all of the fold lines below it in Figure 7 fold towards the viewer, all of the other fold lines fold away from the viewer. After the folding, flaps 21, 22, 23, 24 are glued to panels 25, 26 to form lid 3; flap 27 is glued to panel 28 and flap 29 is glued to panel 30 to form case 2; and flaps 31 and 32 are glued to panel 33 to form support tray 4. In the course of erecting lid 3, a wooden rod 7 of circular cross-section 77 is glued to panel 34 so that its ends project through holes 35 to form lugs 7 that can slide in slots 8. Rod 7 may have a flat where it makes contact with panel 34 to facilitate this gluing. The cut-out 14 should not be too large, since this could detract from the rigidity of support 4.

Feature 20 is optional and is a leaf-spring 20, glued to the top side or the underside of web 1. It is in fact permanently doubled over at hinge line 9/10, and half

of it is glued to panel 28. When hinge line 9/10 is folded over, the other half of leaf-spring 20 is glued to the base of holder tray 4. Leaf-spring 20 is fully folded over in its un-stressed condition if it is required to urge container 1 closed. Alternatively, it is some way from being fully folded over in its un-stressed condition  
5 if it is required to urge container 1 open.

The principle of the Figure 1 embodiment of Figures 1 to 4 is that the three rotary connection means are substantially in line as seen in the lower part of Figure 8 when container 1 is closed and are located at the corners of the triangle shown in Figure 8 when the container 1 is open, this having been achieved by pushing the middle  
10 connection means in the direction of the arrow shown in Figure 8. The case and lid in the two states of container 1 are indicated in dashed lines in Figure 9. In the alternative arrangement shown in Figures 10 and 11, the container 1 is pushed from the triangular arrangement to the in-line arrangement. Figure 12 shows an alternative form of the case and lid. In the arrangement of Figures 13 and 14, the middle means  
15 is pushed from one triangular position to the opposite triangular position. It will be a pre-see 8 in that, in each of the arrangements of Figures 8 to 14, the combination of case and lid will be slightly longer in the in-line position than in one of the triangular positions. To accommodate this, the arrangement of Figures 1 to 4 provides a shift feature, as illustrated in Figure 15. All of Figures 8 to 15 illustrate only part  
20 of the total movement required to open container 1. As shown in Figure 16, the rotary shift means 7, 8 may be replaced by a pair of rigid straps 36 connected by pivots 37 and 38 to lid 3 and support 4 respectively. The pair of pivots 37, 38 allows this connection to provide rotation and shifting as required. Again, as shown in Figure 17, the rotary shift means 7, 8 may be replaced by an elastic strap 39

connected at one end to lid 3 and at the other end to support 4, which again allows this connection to provide rotation and shifting as required.

Although the rotary and shift function has been illustrated only in relation to the connection between lid 3 and holder 4, such a function can be provided between case 2 and holder 4, or between lid 3 and case 2, or in any two of these locations, or in all three of them. The rotary function may be separated from the shift function in any of these locations.

It will be apparent that there has been illustrated a container 1 comprising a case 2, a lid 3 and a support 4, in which there are first means 11/12 and to effect a rotary connection of the case 2 to the lid 3, and second means 9/10 and third means 7/8 to effect a rotary connection of the case 2 and lid 3 respectively to the support 4, the first means 11/12 being intermediate between the second means 9/10 and third means 7/8, at least one 7/8 of the said means being adapted to effect also a shift connection. Said one means 7/8 is adapted to effect a rotary and slidable connection. Said third means 7/8 comprises a said shift connection means.

The case 2 has a closed end 201 that is rotarily connected by said second means 9/10 to the support 4 and has an open end 202, and the lid 3 has an open end 301 at which it is rotarily connected by said first means 11/12 to the open end 202 of the case and has a closed end 302 rotarily connected by said third 7/8 means to the support 4. Said rotary connection means 7/8 comprises a pin-and-socket rotary connection 7/8. Said rotary connection means 9/10 and 11/12 comprise a bending member rotary connection 9/10 and 11/12, Figure 5. Said rotary connection means 39 comprises an elastic rotary connection 39. Said shift connection means 7/8 comprises a pin-and-guide connection 7/8. Said shift connection means 36/37/38

comprises a double pivot connection 36/37/38. Said in shift connection means 39 comprises an elastic connection 39.

The support 4 has a gap 14 through which an actuator, e.g. a finger, can open the container 1. The support 4 has the form of a tray 4 in which the case 2 and lid 3 can  
5 rest when the container 1 is closed. The support 4 has the form of a frame 4. The support 4 has opposite side walls 401, 402, Figure 4 which can be gripped to grip the container 1, each having an upward gap 13 and below this a gripping region 131. The container 1 has latching means 5, 6 to hold the container 1 closed, and there are relief means 62 to facilitate the action of the latching means 5, 6. The latching means 5,  
10 6 comprise lugs 5 on either side of the container 1, or magnetic means 5, 6 to have a latching effect to maintain the container 1 closed.

There has been illustrated a container 1 comprising a base 4, a case 2 pivoted to the base 4, and a lid 3 pivoted to the case 2 and pivotally slidably connected to the base 4, the container 1 being such that it can be held in one hand and simultaneously  
15 opened using only that hand, the lid-to-case pivot 11/12 being intermediate between the case-to-base pivot 9/10 and the lid-to-base connection 7/8. The case 2 has a closed end 201 that is pivoted to the base 4 and has an open end 202, and the lid 3 has a hinge 11/12 at which it is pivoted to the open end 202 of the case and has a closed end 302 pivotally slidably connected to the base 4. The base 4 is provided  
20 with slots 8 and the lid 3 has lugs 7 which slide pivotally in the slots 8. The closed end 201 of the case 2 is mounted to the base 4 by means of a pair of cylindrical pivot lugs 9 assembled co-axially within corresponding circular holes 10 in the base 4, the open end 202 of the case 2 has a boss 12 parallel to the edge of the case 2 with a concentric (co-axial), cylindrical hole (inside boss 12), the lid 3 has a corresponding

cylindrical pin 11 assembled co-axially with the hole in the boss 12, thereby providing a hinge 11/12 interconnecting the case 2 and lid 3 and providing a second pivot point 11/12, the closed end 302 of the lid 3 is mounted by means of a pair of cylindrical lugs 7 inserted into a corresponding pair of slots 8 in the base 4, these lugs 7 being  
5 free to slide within the slot 8 length. The base 4 has a cut-through 14 through which a finger can push the case 2 from the underside of the base 4 to open the container 1. The latching means 5, 6 comprise two protruding lugs 5, 5 one on each side of the case 2 which, when the container 1 is closed, have a latching effect to maintain the container 1 closed.

10 It will be apparent to one skilled in the art, that features of the different embodiments disclosed herein may be omitted, selected, combined or exchanged and the invention is considered to extend to any new and inventive combination thus formed. Where a preference or particularisation is stated, there is implied the possibility of its negative, i.e. a case in which that preference or particularisation is  
15 absent.

Many variations of the invention and embodiments hereinbefore described will be apparent to people skilled in the art and all such variations are to be considered as falling within the scope of the invention.